Candidate Name	Centre Number	Candidate Number

ZIMSEC
For Performance Measurement

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Advanced Level

BIOLOGY 6030/2

PAPER 2 THEORY STRUCTURED

SPECIMEN PAPER 1 hour 30 minutes

Additional materials:

Electronic calculator

TIME: 1 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES

The intended number of marks is given in brackets [ ] at the end of each question or part question.

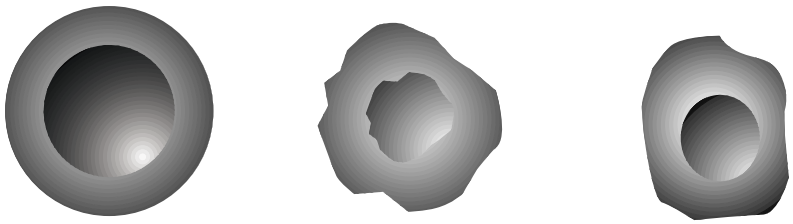
FOR EXAMINER'S USE	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
TOTAL	

This specimen paper consists of 12 printed pages.

For Examiner's Use

Answer **all** questions

1 **Fig. 1.1** shows three cells, A, B and C, that have been placed in salt solutions of different concentrations.



cell A cell B cell C

Fig. 1.1

(a) Explain each of the following in terms of water potential:

(i) Cell A did not change size at all

_____

_____ [1]

(ii) Cell B burst.

_____

_____ [1]

(iii) Cell C decreased in volume.

_____

_____ [1]

(b) State the process that is responsible for the changes to cells B and C.

_____ [1]

(c) **(i)** Give **one** similarity between active transport and facilitated diffusion.

_____ [1]

(ii) Give **one** difference between active transport and facilitated diffusion.

_____ [1]

[Total: 6]

For Examiner's Use

2 **Fig. 2.1.** shows a globular protein.

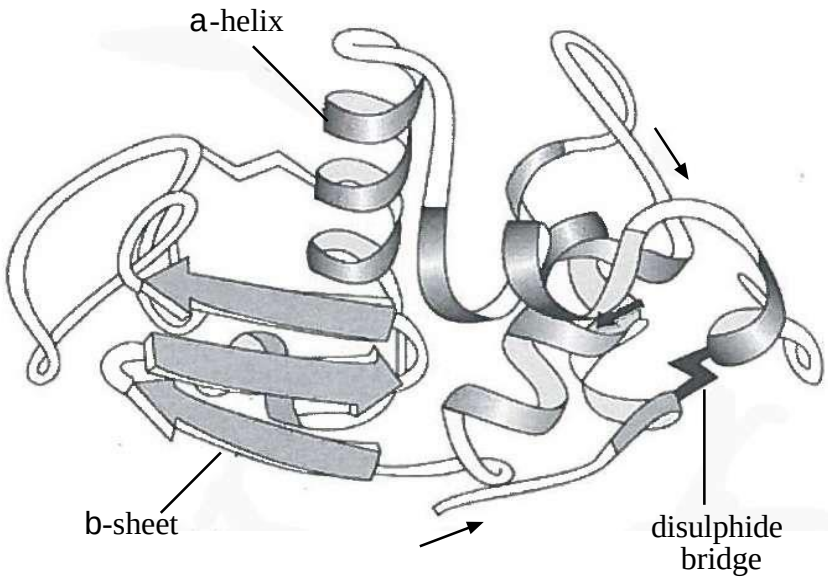


Fig. 2.1

(a) Use your knowledge of proteins and **Fig. 2.1** to explain how this protein shows secondary and tertiary structure.

(i) secondary structure _____

_____ [1]

(ii) tertiary structure _____

_____ [1]

(b) Name two other bonds, besides the one shown in **Fig. 2.1**, which hold the globular protein in shape.

_____

_____ [2]

(c) Explain how the structure of a named globular protein is related to its function

_____

_____

_____ [2]

[Total: 6]

For Examiner's Use

3 **Fig. 3.1** shows a stage of nuclear division.

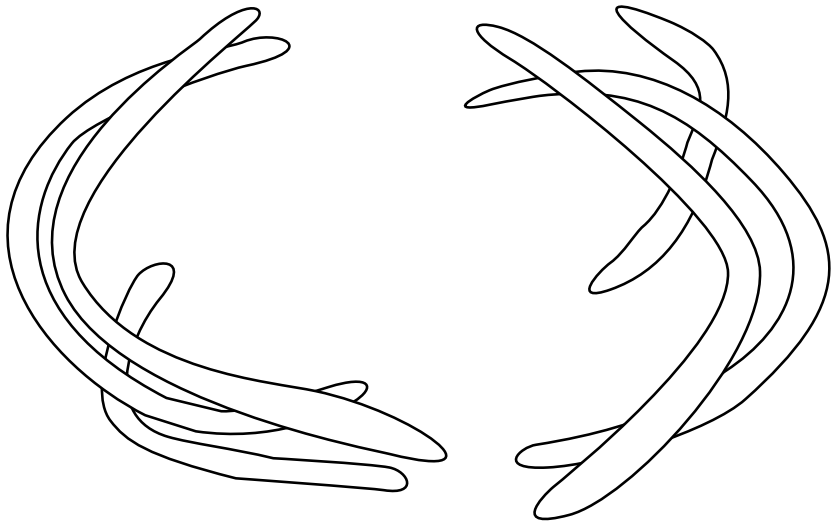


Fig. 3.1

(a) **(i)** State the stage of nuclear division in **Fig. 3.1**.

_____ [1]

(ii) Describe **one** piece of evidence, visible in **Fig. 3.1**, which could be used to confirm the type of nuclear division shown.

_____

_____ [2]

(b) Explain the significance of the separation of homologous chromosomes during meiosis.

_____

_____

_____ [2]

[Total: 5]

For Examiner's Use

4 **Fig. 4.1** shows the transfer of a useful gene from a donor plant cell in the production of a transgenic crop plant. The numbers on **Fig. 4.1** show the stages in the process.

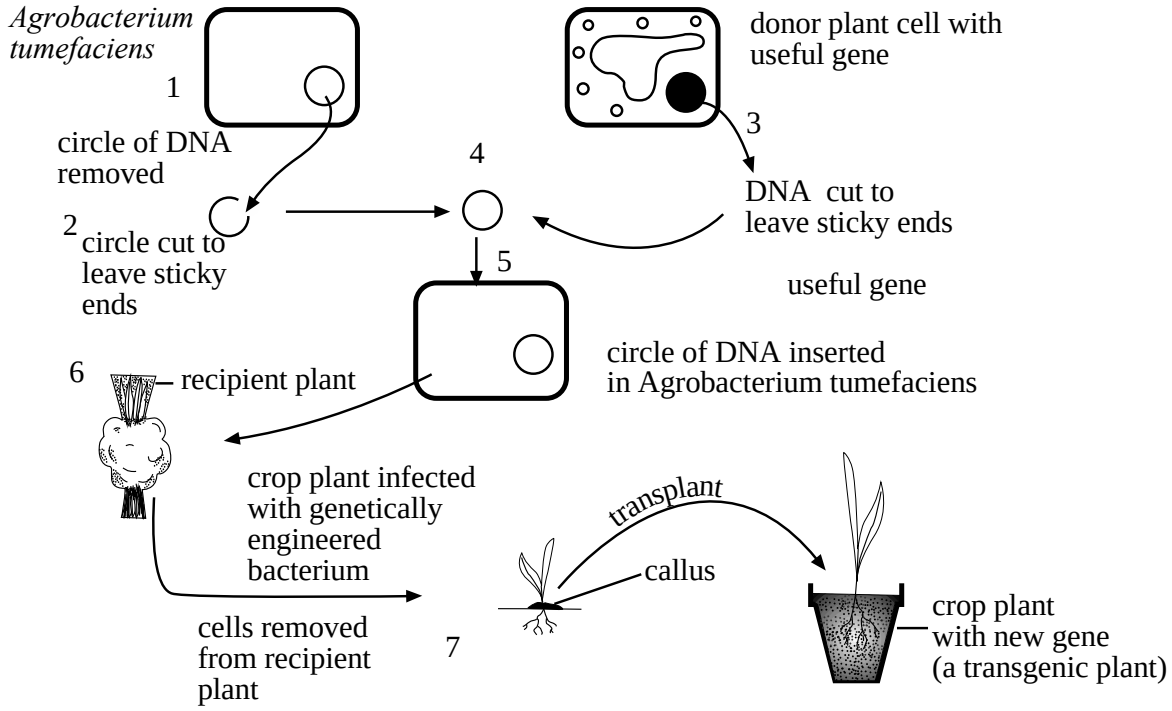


Fig. 4.1

(a) Identify the circle of DNA found in the bacterium A. *tumefaciens*.

_____ [1]

(b) **(i)** Name the type of enzyme used to cut the DNA

_____ [1]

(ii) Explain why it is important to use exactly the same enzyme to cut both the DNA and the circle of DNA.

_____

_____

_____ [2]

(c) State how the new gene was incorporated into the DNA of the crop plant cells.

_____

_____

_____ [2]

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(d) Suggest how one would know if the gene had been transferred successfully.

_____

_____[1]

[Total: 7]

5 **Fig. 5.1** shows the structure of ATP.

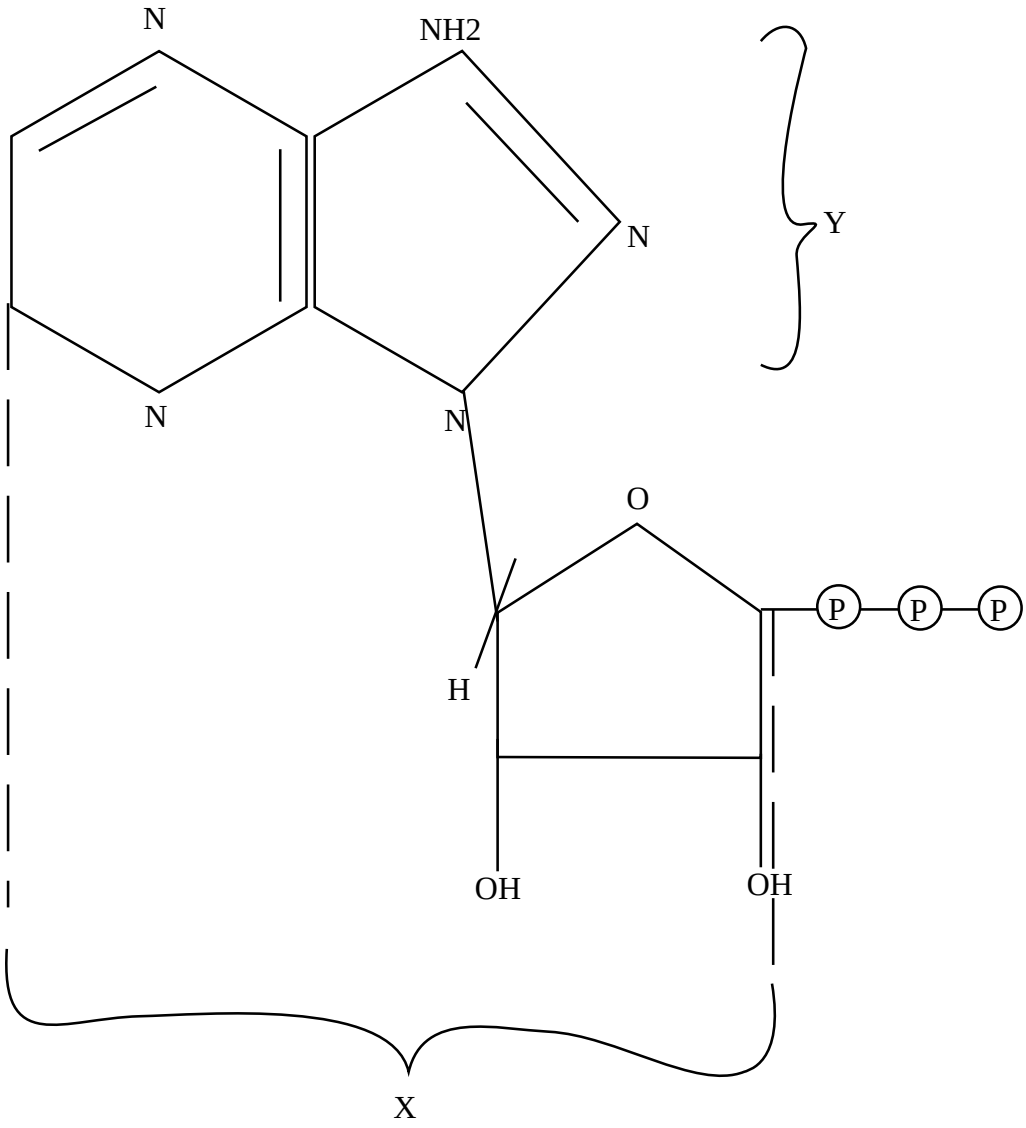

Fig. 5.1

(a) **(i)** Identify the parts labelled X and Y.

X _____

Y _____ [2]

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(b) State precisely **one** site in a cell where ATP is synthesised.

_____

_____ [1]

(c) Explain why ATP is regarded as the universal currency of energy in all living organisms.

_____

_____

_____ [3]

[Total: 6]

6 **Table 6.1** shows concentrations of substances found in a sample of phloem sap.

Table 6.1

Solute	Concentration ($moldm^{-3}$)
Sucrose	250
Ions	112
Plant growth substance	small traces
Amino Acids	40
ATP	0,5

(a) **(i)** Identify **two** organic substances that are synthesised during photosynthesis by the plant.

1. _____

2. _____ [2]

(ii) One of the ions tested for in the phloem sap sample were nitrate ions. The value obtained was $Omoldm^{-3}$. Suggest a reason for this.

_____

_____ [1]

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(b) Describe the loading of sucrose into the phloem.

_____

_____

_____

_____

_____

_____ [3]

[Total: 6]

7. **Fig. 7.1** shows a typical neurone.

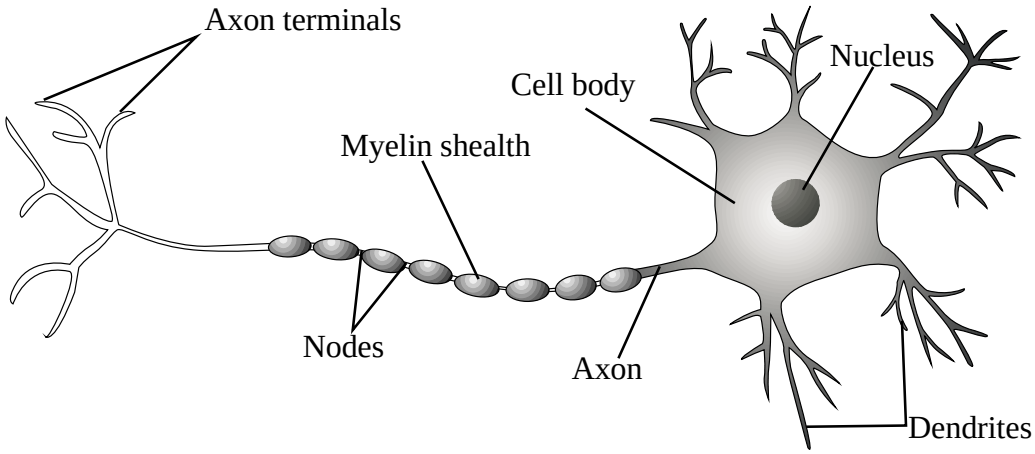

Fig. 7.1

(a) **(i)** Identify the type of neurone shown in **Fig. 7.1.**

_____[1]

(ii) State the function of the neurone in **Fig. 7.1.**

_____[1]

(iii) On **Fig 7.1**, indicate using a arrow the direction of conduction of the nerve impulse.

_____[1]

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(b) Explain the significance of the gaps in the myelin sheath.

_____

_____

_____

_____ [2]

(c) Distinguish between a nerve and a neurone.

_____

_____

_____ [1]

[Total: 6]

8 **Fig. 8.1** shows a germinating pollen grain as seen using a light microscope.

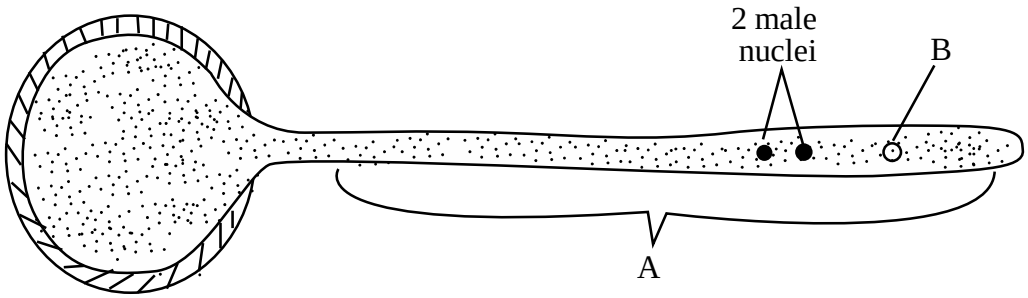


Fig. 8.1

(a) Name the parts labelled A and B.

A _____

B _____ [2]

(b) Explain the functions of the two male nuclei during fertilisation.

_____

_____

_____

_____ [2]

(c) Describe how the **two** male gametes are produced from the pollen mother cell in the anther.

For Examiner's Use

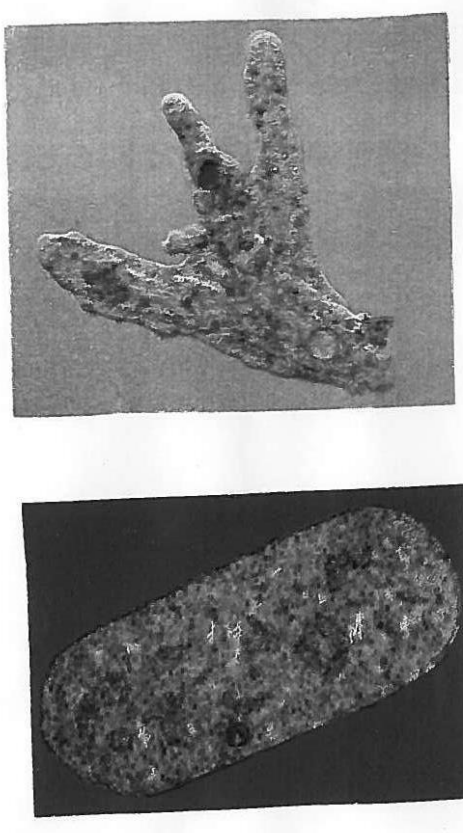
_____

_____

_____ [2]

[Total: 6]

9 **Fig. 9.1** shows micrographs of two unicellular organisms A and B, that belong to different Kingdoms.



A

B

Fig. 9.1

(a) **(i)** Classify the **two** organisms into their respective Kingdoms.

A. _____ [1]

B. _____ [1]

(ii) State any **two** diagnostic features of organism B.

Feature 1._____

Feature 2._____[2]

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(b) Describe the ecological niche of fungi.

_____

_____

_____ [2]

[Total: 6]

10. The "split" cell in **Fig. 10.1** represents part of a phagocyte and part of a lymphocyte in action.

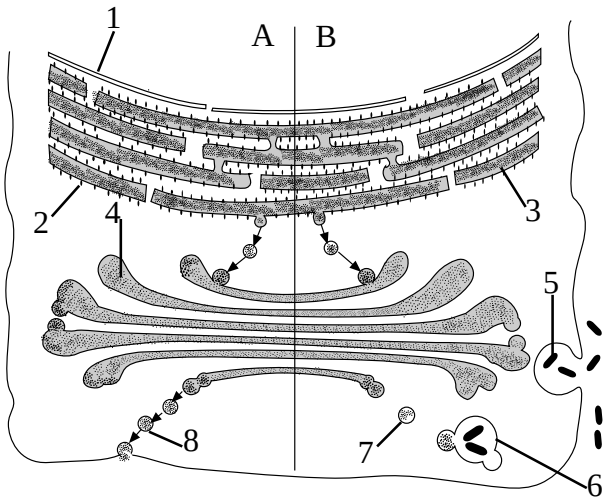

Fig. 10.1

(a) Identify the cell represented by A and B.

A _____

B _____ [1]

(b) Name structures labelled 1 to 4.

1 _____

2 _____

3 _____

4 _____ [2]

(c) Compare the contents of structures 7 and 8.

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_____

_____

_____

_____ [2]

(d) Suggest how a phagocyte avoids self digestion during the process of phagocytosis.

_____

_____ [1]

[Total: 6]